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Current State of Geriatric Dentistry: The State of Oral Health and the Quality of Dental Care of Seniors in Nursing and Retirement Homes

Silvia Brandt[1*], Eugenie König[2], Sarah Schubothe-Zacher[2], Hans-Christoph Lauer[1], Anna Kunzmann[1]

[1]Department of Prosthodontics, School of Dentistry, Goethe University, Frankfurt am Main, Germany

[2]Dentist in Private Practice, Germany

[*]**Corresponding author:** Silvia Brandt, ZZMK Carolinum, Theodor-Stern-Kai 7, Haus 2960590 Frankfurt am Main, Germany. Tel: +49693014721; Fax: +49693013711; Email: hajjaj@med.uni-frankfurt.de

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Abstract

Study Background: The number of older patients is rising steadily. The number of edentulous patients continues to decrease thanks to preventive measures and thanks to the number of available abutments being augmented by implants. However, residual teeth as well as implants and the prostheses they support require more sophisticated care and oral hygiene than the less and less popular complete dentures.

Previous studies had already highlighted massive shortcomings in dental care in nursing and retirement homes and momentous deficits in the staff's oral hygiene training and its practical implementation and called for adjustments to the curricula and improved dental care. The aim of this study was to evaluate the current status of dental care of seniors in nursing and retirement homes at the present time and to explore whether previous demands were implemented.

Material and Methods: A survey of 108 senior residents and 10 care managers was conducted at 10 nursing and retirement homes in the Stuttgart, Germany area, carrying out dental examinations to acquire data and evaluating the responses to questions on specific questionnaires.

Results: The results documented overall bad dental and oral health and an extensive need for dental treatment in nursing and retirement homes. However, care managers at those institutions have become more acutely aware of the issue. Problems often arise due to time constraints and a lack of nursing staff. In addition, by whom and how dental care is to be provided is often inadequately defined.

Conclusion: The oral health status of institutionalized seniors still reveals major deficits, which can also influence the general health. The dental profession is called upon to continue a vigorous political, social, and professional discourse in the field of nursing care and support of the elderly.

Introduction

Decreasing birth rates and the aging of the strong age cohorts currently in their middle-age years have initiated substantial changes in the general population's age structure. According to the German Statistical Office, by 2060, one out of three inhabitants of Germany (32% to 33%) will be at least 65 years of age. This is reflected in particular in the numbers of the very old. The number of over 80-year-olds will increase steadily, from 4.4 million in 2013 to 10 million in 2050-the highest level ever. This will be a major challenge for the dental care and general healthcare systems of the future [1]. The number of geriatric patients and of patients requiring nursing care in an institutional context is expected to increase due to a higher life expectancy and to changes in social and family structures. Thanks to good dental care and prophylaxis, future patients requiring long-term nursing care will increasingly present with their own residual teeth, implants, and with - often elaborate and comprehensive - prosthetic restorations, which are more difficult to care for and maintain than the previously dominant complete dentures [2]. Affected patients are often immobile, so that

dental treatment can be facilitated only after providing expensive transportation to the dental practice or by enlisting the services of dentists making house calls.

In recent decades, numerous studies in the field of geriatric dentistry have highlighted massive shortcomings of dental care in nursing homes and large deficits on the part of the nursing staff when it comes to oral hygiene training and its practical implementation. Demands have therefore been voiced to make adjustments to the relevant curricula and to improve dental care.

The present study aims to examine whether the efforts of the past few years have resulted in noticeably changes in the oral hygiene and health of residents, by evaluating the current situation of the dental care of seniors in nursing and retirement homes.

Material and Methods

Study Design: The study was carried out from October 2010 to January 2012 in 10 nursing and retirement homes in the Stuttgart area by a dentist with special training in the field of geriatric dentistry ("investigator"). The investigator had been already involved in the preparation of the questionnaires, so that no instruction or calibration was necessary.

Internet research at the time of the study identified 60 nursing and retirement homes in the Stuttgart area within a radius of 30 square kilometers of its center. These were contacted by telephone, whereupon 10 homes agreed to participate in the study. The residents at these 10 nursing homes were filtered on the basis of previously defined eligibility criteria. The inclusion criteria were informed consent to participate in the study and the consequent willingness to undergo a dental examination. In addition, one requirement was that the residents be mentally and physically fit to be interviewed. Severe dementia as well as severe mental illness were exclusion criteria, as were malignant diseases. All residents who met the inclusion criteria were included in the study. In all, an average of 10.8 residents (n = 108) of all care levels per home and the respective care managers (n = 10) were interviewed. Written consent was required of all study participants or their legal representatives for participation in the study. Withdrawal from participation in the study was possible at any time, with no reason required to be given.

Prior to conducting this study, the project had been reviewed by the responsible ethics committee, which did not deem an ethics vote to be necessary.

Survey of Care Managers in Nursing and Retirement Homes: The 10 participating care managers were asked to complete a three-page questionnaire designed specifically for this study. General questions were asked about the number of residents and their age and gender distribution. In addition, specific questions were asked about examinations conducted upon the arrival of new residents and on dental care and dental treatment during their stay. Respondents also provided information about the presence or absence of a treatment room, the performance of on-site dental treatments, supervision by a responsible dentist, and the frequency of any check-ups.

In addition, questions were asked about the oral health and the condition residents' teeth and about the level of knowledge about oral hygiene on the part of the staff, and about whether unhealthy dietary habits or a reduced food intake could be related to oral-health problems.

Survey of Residents: General information about the residents (gender, marital status) and their general medical history (underlying diseases, medications, alcohol and tobacco use) were extracted from the patient files. Residents were queried as to their general condition.

The dental anamnesis determined the dental and oral health, soliciting information about masticatory function, xerostomy status, oral hygiene, denture retention and fit, the presence of pressure sores, and access to dental care. In addition, the patients were interviewed about their oral health-related quality of life using the German Oral Health Impact Profile (OHIP-G 14) questionnaire [3].

Examination of Residents: The examination of the residents took place in their respective private rooms. The diagnostic tools used included, in addition to a dental and periodontal probe, a disposable mirror, a wooden spatula and a flashlight.

The dental examination included assessments of oral health (Revised Oral Assessment Guide, ROAG), The Dental Status (DMF-T), the Periodontal Screening Index (PSI), and the Denture Hygiene Index (DHI).

Dental status(DMF-T) [4,5]**:** Along with determining the dental status, the DMF-T index was calculated based on the findings. The DMF-T index records the number of Decayed, missing (because of caries) and Filled (because of caries) Teeth. For better comparability, the third molars were not included, so the reference value was 28.

Periodontal status (PSI) [6]**:** The Periodontal Screening Index (PSI) was used to diagnose the status of the periodontal tissues. For this purpose, probing depths were measured with a millimeter-scaled periodontal probe at 6 sites per tooth (PCP 15; Hu-Friedy, Chicago, IL, USA). The measurements were used to assign residents to one of four predefined categories, where 0 indicated a healthy gingiva; 1 and 2, gingivitis; 3, moderate periodontitis; and 4, severe periodontal disease.

Denture hygiene (DHI) [7]**:** The Denture Hygiene Index (DHI) was used to indicate denture hygiene. For each complete and partial denture, 10 areas are examined for existing deposits using a Yes/No rating method. No distinction was made between hard and soft deposits. The result was reported as a score between 1 and 10.

Oral health (ROAG) [8]**:** The Revised Oral Assessment Guide (ROAG) was used to evaluate oral health. The ROAG is a standardized questionnaire that includes the systematic examination of 12 parameters (voice, lips, oral mucosa, tongue, gingiva, tooth/denture hygiene, saliva, swallowing, caries, as well as denture fit, denture retention, and denture defects where applicable). The scores for each of these parameters was assigned to one of three categories (I - healthy or normal, II - minor deviation, observation required, III - severe deviation, consultation required).

Statistical Analysis: When evaluating the results, absolute and percent frequencies were calculated using the Excel 2007 spreadsheet program and the SSPS 13.0 statistics program.

Critical Assessment of the Results

All in all, 108 residents were examined and interviewed, of whom 90 were women and 18 were men. Their mean age was 82.6 years, broken down as follows; 60 to 70 years, 7%; 70 to 80 years, 12%; 80 to 90 years, 64%; over 90 years, 17%).

Nursing or retirement homes	Total number of residents	Of which men	Of which women	Study participants	Of which men	Of which women
H1	70	15	55	12	2	10
H2	66	25	41	10	3	7
H3	27	0	27	11	0	11
H4	111	24	87	12	1	11
H5	132	37	95	12	4	8
H6	86	11	75	10	1	9
H7	50	12	38	10	1	9
H8	150	38	112	11	2	9
H9	62	26	36	10	2	8
H10	80	29	51	10	2	8
Total		217	617	108	18 (16.7% of participants)	90 (83.3%)

Table 1: Overview of the participating nursing/retirement homes and residents.

The number of residents of the participating homes ranged from 27 to 150, for an average number of residents of 83.4 per home. In order to ensure the highest possible number of respondents, all residents who were willing to participate and met the inclusion criteria were included in the study, regardless of the size of their institution. The participants often suffered from diabetes, cardiovascular and further general diseases. But only severe dementia, severe mental illness and malignant diseases were exclusion criteria's. On average, 10.8 residents per home were included in the study (10 to 12 per home).

Of the residents examined, 41% wore complete dentures, while 59% still had some of their own teeth; 14% wore fixed restorations. In total, 81 prostheses were examined.

Results for Residents Requiring Nursing Care

Survey of residents: Their masticatory function was rated as "very good" by 32% of respondents; as "good," by 46%; and as "bad," by only 22%. Their oral condition received similarly good marks. The majority of respondents (89%) said they had a clean mouthfeel. Dry mouth was reported by 42% of respondents.

The majority of respondents were satisfied with the retention of their denture. The retention of their maxillary denture was rated as "good" by 46% of respondents; as "adequate," by 29%; and as "bad," by only 25%. The retention of their mandibular denture was rated as "good" by a full 63% of respondents; as "adequate," by 28%; and as "bad," by only 9%. Nearly a quarter of respondents (23.5%) said they had acute pressure sores. The impaction of food particles between the denture and the mucosa due to an ill-fitting denture base was deplored 60.5% of denture wearers. The prosthesis was worn both during the day and at night by 64.2%. Twice daily denture cleaning was reported by 43% of respondents, while a further 27% reported additional cleaning after each meal. Only 30% cleaned their dentures less frequently.

Natural teeth were cleaned 2 to 3 times daily by 68% and once a day by 23% of respondents. Only 9% reported cleaning their teeth less frequently. The last dental check-up was over a year ago for most (59%) residents, and 66% said they only underwent a dental exam in the presence of pain.

When evaluating the OHIP-G questionnaire, the highest scores were found for the physical disability (224), physical pain (204), and handicap (137) groups. Low scores were found for mental disability (57), disability (42), and mental discomfort (29). The lowest score of 0 was found for social impairment.

Examination of Residents

Dental examination: Evaluation of all study participants yielded a mean DMF-T of 25.34. The 34 participants in the 70- to 80-year age group exhibited a mean DMF-T score of 25. The 49 participants in the 80-to -90-year age group exhibited a mean DMF-T score of 25.6. The 25 residents in the above-90 age group exhibited a mean DMF-T score of 25.3.

Figure 1 gives an overview of the distribution within the age groups.

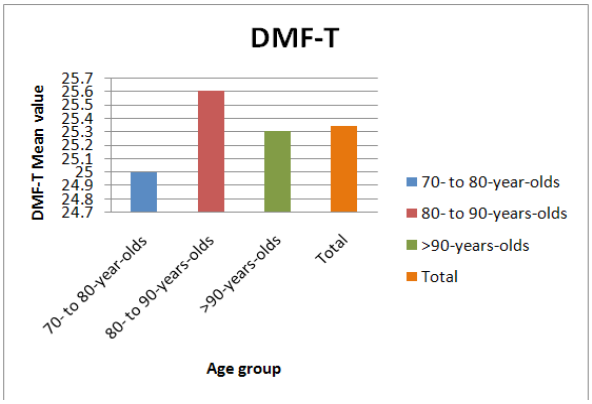

Figure 1: Overview of the DMF-T evaluations.

Periodontal status: Of the residents examined, 29% presented with gingivitis, 30%, with medium-severe periodontitis, and 12%, with a severe form of periodontitis. The best gingival condition was diagnosed in the edentulous residents (29%).

Denture hygiene: Of the possible ten areas of the dentures inspected that were potentially affected by plaque, 50.6% had a DHI score of 8 to 10. In 32.9% of the dentures, plaque was found in 5 to 7 areas; in 13.4% of dentures, in 1 to 4 areas. Only for 3.1% of dentures, a DHI score of 0 indicated a clean restoration.

Oral health (ROAG): Very high scores were recorded in the ROAGIII – Consultation required category (Figure 2). The tooth and denture hygiene subgroup contained 80 subjects with generalized plaque and concrements (74.1 %). The caries subgroup contained 29 subjects with brown spots and defect formation. The denture retention subgroup included 32 respondents whose dentures detached spontaneously. The dentures of 23 respondents in the denture fit subgroup rocked visibly.

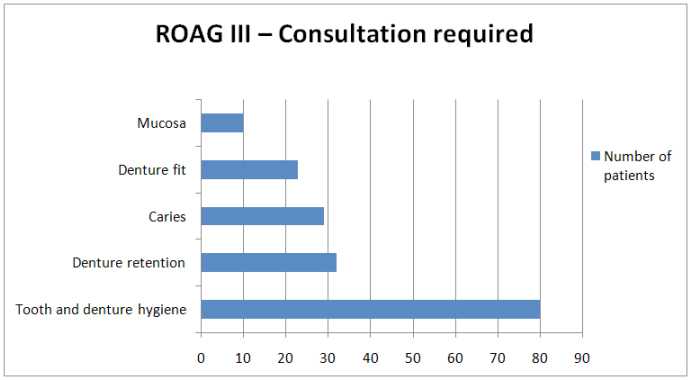

Figure 2: Overview of ROAG III - Consultation necessary.

During the dental examination, the findings were mist frequently classified as category II. Figure 3 shows the most common findings requiring observation.

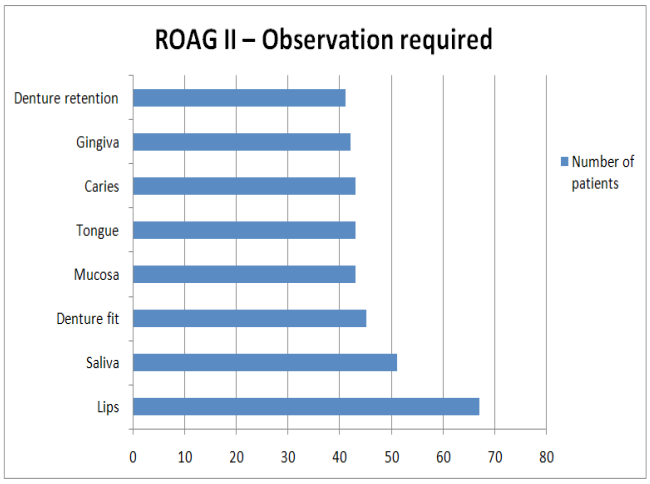

Figure 3: Overview of ROAG II.

Most I - Healthy or normal ratings were found in the voice (98), swallowing (99), and no denture defects (60) subgroups.

Of the 81 dentures examined, 16% exhibited a good denture fit, and 9.8% of dentures were not released by moderate traction. Consequently, the remaining dentures exhibited moderate (50.7%) to poor (39.5%) denture retention, and an insufficient denture fit with palpable (55.6%) and visible (28.4%) denture rocking.

Examination	Category	Clinical findings	No.
Voice	I	Normal	98
	II	Deep or raunchy	8
	III	Talking difficult/painful	2
Lips	I	Soft and rosy	27
	II	Dry and cracked	67
	III	Ulcerated and bleeding	14
Mucosa	I	Rosy and moist	55
	II	Redness or white coating	43
	III	Very red or swollen, white coating, ulcerations	10
Tongue	I	Rosy and moist, papillae present	52
	II	dry, no papillae or white/red discoloration	43
	III	very thick white coating, ulcerations	13
Gingiva	I	Rosy with tiny pits	56
	II	Edematous with or without redness	42
	III	Spontaneous bleeding or bleeding on pressure	2
Cleanliness teeth/ restorations	I	Clean, no deposits	8
	II	Localized plaque or concrements	20
	III	Generalized plaque or concrenments	80
Saliva	I	No adhesion of the intraoral mirror to the mucosa	44
	II	Slightly increased friction, no signs of adhesion	51
	III	Significantly increased friction, mirror exhibits adhesion	13
Swallowing	I	Normal swallowing	99
	II	Slight pain	8
	III	Not possible	1
Caries	I	No discoloration	5
	II	Brown stains or discolored filling/crown margin	43
	III	Brown stains and defect formation	29
Denture fit	I	No rocking	13
	II	Perceptible rockling	45
	III	Visible rocking	23
Denture retention	I	No release on moderate traction	8
	II	Release on moderate traction	41
	III	Spontaneous release	32
Dentures with fractures	I	No fractures	60
	II	Defective veneers	17
	III	Defects of the denture base or retentive elements	4

Table 2: Evaluation of the ROAG results (Revised Oral Assessment Guide).

Survey of Care Managers in Nursing and Retirement Homes

Dental Care and Treatment: The survey of the care managers showed that not one of the ten nursing and retirement homes carried out dental exams on admission. Nor was any dental prophylaxis performed in any of the ten institutions.

The reasons cited included the difficulty in moving the patients, which was most frequently mentioned (80%), but also high workloads (10%) and the unavailability of a competent dentist (10%). Furthermore, there was no defined dentist, which was responsible for the dental treatments and checkups of the residents in the participating nursing and retirement homes. Thus, in general without pain or any need of treatment, no dental care and prophylaxis was done in the institutions. The only support of oral hygiene was done by the nursing staff.

Half of the care managers would like to see an improvement in dental care. Only 50% of homes had a dentist who was specifically in charge. Only half the care managers rated the collaboration with the dentist as satisfactory. Although dental treatment was provided in all participating homes, no dedicated dental treatment room was available in any of them.

Oral Hygiene Measures: The majority of care managers rated the oral hygiene of residents as "good" (30%) or "adequate" (40%). Only 30% of respondents rated the prevailing oral hygiene as bad. Care managers of all homes stated that the nursing staff assisted residents with their oral hygiene. The support of a dental hygienist for guidance and implementation of oral hygiene measures would be welcomed by all care managers. The influence of oral health on the patients' overall well-being was considered to be low. Only 20% see a possible correlation.

Level of Knowledge of the Nursing Staff: Care managers of all homes reported that the nursing staff had received training in dental hygiene and denture care (theoretical, 100%; practical, 80%).

Quality Management: The incidence of dental problems was reported as once a week in 20% of institutions and as once a month in 80% of institutions. Standard procedures and some form of quality management in the event of dental problems existed at only 40% of the institutions.

Nutrition: Chewing problems/disorders were seen by 90% of service managers as the cause of reduced food intake or nutritional imbalances. They reported that many residents were able to eat only mashed or pre-cut food.

Discussion

The present study provides an overview of the current state of oral health and dental care of the seniors in the nursing and retirement homes that were included. The results of the present study show that a systematic approach to dental care in nursing or retirement homes is still lacking and that serious deficiencies prevail regarding the oral health of the residents. This has to be seen critical, because a poor dental status can influence the patients' general state of health on the one hand and the general dental health on the other hand. Hereby, a need of dental treatment (e.g. insufficient dental treatments/prosthesis) can cause a reduced food intake and the related loss of weight. This can weaken the patient and result in a deterioration of the general condition. In addition, a poor dental status and a bad oral hygiene can enhance the development of secondary caries, periodontal diseases and tooth loss. Periodontitis furthermore leads to a persistent activation of the immune system and is associated with vascular diseases and an increased risk of diabetes, cardiovascular diseases and rheumatoid arthritis (9-13).

Thus, an improvement and better support of the oral health of elderly people could also improve the general constitution of the patient and the related quality of life.

Survey of Care Managers in Nursing and Retirement Homes: Papa et al. [14] and Wefers et al. [7] had called for initial dental examinations to identify the potential treatment needs. But even today, none of the nursing and retirement homes surveyed carry out dental examinations of new residents on arrival. The survey also showed that no regular dental check-ups were performed at any of the homes. The reason most frequently mentioned was the difficulty to move immobile residents. In addition, the situation was made more difficult by the very complex procedure of applying for and obtaining transport permits for bedridden seniors. This further underlines the importance of regular on-site check-ups at nursing and retirement homes

Not only, because the oral health can influence the general health, Nitschke [15] had demanded comprehensive dental attention for residents requiring nursing care, with semi-annual screenings. Nippgen [16] reported that care managers often found it unreasonable to subject residents to a routine check-up because it violated their right to self-determination and interfered with their privacy. This, however, contradicts the stipulation of Section 11 Para. 3 of the German Residential Home Act, which confers an obligation on institutions to ensure health and the provision of nursing care for their residents. In the present study, 60% of care managers believed that seniors wished to receive regular dental care. In view of the existing need, this would indicate a lack of initiative on the part of the supporting organizations of these institutions and/or a shortage of dentists offering appropriate services. This assumption was confirmed in the survey of care managers; care managers at institutions served by a dentist often had to seek out that dentist on their own initiative.

There was no dental treatment room in any of the homes; even in relatively new facilities, no such room was provided for in the building design. The findings indicate, however, that dental problems occur at least once a month in 80% of homes and once a week at 20% of homes. This alone would justify the provision of a dental treatment room. Furthermore, the presence of a treatment room would facilitate standard oral prophylaxis and simplify dental exams, preventing many problems or and much pain before they occur.

There has been a positive development in the field of staff training in dental hygiene methods. While Stark [17] still reported a lack of willingness on the part of the dental profession to work in nursing and retirement homes, the present interviews with care managers showed that the nursing staff now received supplementary oral hygiene training in all institutions surveyed. This can be explained by the newly established offerings by ombudspersons for the elderly and disabled, who have created a network of dentists who regularly offer training for the nursing staff. Studies from Sweden and the USA have shown that even perfunctory instructions in oral hygiene promoted the staff to address the residents' oral care needs effectively and diligently [18,19]. Likewise, dental care has already been included in nursing education as an integral part of the curriculum. However, the dental examination of the patients unveiled pathological periodontal

findings attributable to inadequate oral hygiene. The assessment of denture hygiene indicates moderate to poor care based on the DHI scores for a major part of the examined dentures.

It would appear necessary to establish networks of dental hygienist teams, analogous to the existing networks of dentists. All interviewed care managers would welcome the assistance of a dental hygienist. A possible concept for the care of home residents with the involvement of mobile prophylactic teams to support the nursing staff was presented by Benz and Haffner [20]. The results of the present study indicate, however, that systematic dental prophylaxis has not yet arrived at the nursing and retirement homes.

Survey of Residents: The results of the study show that many seniors are very satisfied with their dentures despite the fact that these exhibit major defects. In terms of masticatory function, a majority of residents said they could chew food easily (46%) or very easily (32%). But this does not correlate with the reports by care managers that many seniors could eat only mashed or pre-cut food. Likewise, 89% of residents said their mouths felt clean, while objective examinations - DHI score of 8 to 10 for 50% of dentures (see above) and a ROAG score of 74.1% for plaque - would indicate the opposite.

Although the investigator rated the retention of the dentures as moderate (50.6%) or even poor (39.5%), 46% of seniors thought that their maxillary dentures fit well and 63% thought that their mandibular dentures fit well. But when phrasing the question more specifically by asking about food impacted between the denture base and soft tissue, 60.5% of respondents said they were not satisfied. It must be assumed that older people adapt to unfavorable situations and are still satisfied with it, or have no basis for comparison in terms of possible improvements.

Based on the responses elicited from residents, oral hygiene should not be a problem, as 68% reported brushing their teeth 2 to 3 times a day, while only 9% said they cleaned their teeth less often than once a day. However, in the case of multimorbid patients, it is not so much the frequency as the effectiveness of cleaning that plays a decisive role. Many of the elderly are unable to maintain adequate oral hygiene due to poor vision, immobile wrists, or similar infirmities. The results of the DMS V show that nearly 30% of seniors requiring nursing care are no longer able to clean their teeth and dentures themselves and need help with daily oral hygiene [21]. For this reason, assistance by the nursing staff plays an important role. But according to the residents surveyed in the present study, they receive no help at all with oral hygiene or at most once a day, at night. The situation was similar with regard to the cleaning of dentures, where substantial hygienic deficits were also recorded.

According to Hassel et al. [22], the oral health-related quality of life covers not only functional aspects but also social and psychological ones. In the generally recognized interpretation of the OHIP-G, the reference score was 0 for persons with fixed dentures, 4 with for persons with removable partial dentures, and 6 for persons with complete dentures [23] In the present study, no distinction was made between patients with fixed and removable restorations, since many seniors wore both types. The overall mean for all respondents was 6.7. This result corresponds to the mean scores for the age groups 61 to 70 years (6.7) and above 70 years [24,25]. Although there was no differentiation regarding the type of restoration, the result is quite comparable. It is composed of the higher scores of dissatisfied complete-denture wearers and the lower scores of those with fixed restorations. The highest values were in the categories of functional and physical limitations as well as pain. The lowest value (0) was that for social impairment. This is also consistent with previous studies [26].

Of the residents examined, only 29% wore complete dentures. This number corresponds to the most recent German Oral Health Study (DMS V), which found an increase in the number of implants and a decrease in the prevalence of complete dentures in the elderly. According to the DMS V findings, only one in eight younger seniors (65 to 74 years) today is edentulous today, compared with one in four as recently as 1997. In previous studies, complete dentures were reported by Jäger [27] and Manojovic [28] to be the most common form of restoration in residents of nursing and retirement homes, accounting for 53% and 64.2%, respectively.

Within the different age groups, the mean DMF-T scores were 25 (70 to 80 years), 25.6 (80 to 90 years) and 25.3 (over 90 years). The DMF-T score for all study participants together averaged 25.34. Comparable studies by Ziebolz et al. [29], Gluhak et al. [30]as well as Stubbs and Riordan [31] corroborate this result in their published studies, which yielded DMF-T scores of 25 [29]), 25.6±4.2[30], and 24.7±5.2 [31]. Only Miremadi et al. [32] report a lower DMF-T score of 19.8±6.6,8. It should be noted, however, that edentulous patients were not included in the study published in 2017. As a result, the DMF-T was positively biased and therefore cannot be compared with the result obtained here.

In addition, periodontal disease was a frequent finding. Of the residents examined, 29% presented with gingivitis, 30%, with medium-severe periodontitis, and 12%, with a severe form of periodontitis. Periodontal disease rarely causes pain in the initial stages. In the advanced stage, however, collateral effects may arise that affect the whole body. Numerous studies examining the success of professional teeth cleaning and oral care instructions have shown that PSI scores improve when seniors requiring nursing care participate in systematic prophylaxis programs [20,27,33,34]. Since seniors are predicted to have more and more of their own teeth left, this prophylaxis will become an increasingly crucial factor for the long-term maintenance of healthy periodontal tissues.

It has been shown that they are not regularly examined by a dentist but only when complaints become manifest. This is

also consistent with the results of previous studies [27,35,36]. The majority of seniors reported consulting a dentist only in case of pain. Of the seniors surveyed, only 22.9% believed that they needed dental treatment. However, the actual, objective level of treatment need was 86%. Nitschke [37] also noted that with the reduced use of dental services in older age, one-quarter of seniors have a subjective need for treatment, but over three-quarters have an objective need for treatment.

Although, as has been found in previous studies, there are still major deficiencies in the oral health of residents, it is becoming obvious that the nursing staff has developed a basic dental understanding [38-42]. In all of the nursing and retirement homes surveyed, the staff is being trained to carry out oral hygiene measures. Nursing staff receive theoretical briefings, and 80% of homes also provide hands-on instructions in the form of training.

Nevertheless, when evaluating the results of the present study, it should be noted that the survey results obtained are affected by a positive bias due to the pre-selection of seniors in a good physical and psychological condition, sufficient to answer questions freely and independently. Institutionalized residents assigned to the highest statutory level of nursing care needs seniors could rarely be included in this study; their responses would presumably have resulted in significantly less favorable scores. A further distortion could have been created by the gender makeup of the study participants, as more women than men were included.

Furthermore, it was attempted to cover an extensive number of cases, so that all residents who met the inclusion criteria and agreed to participate in the study were included. Thus, no numerical congruence between nursing and retirement home sizes on one hand and the number of surveyed residents could be obtained. However, this shows that the quality of dental care of the residents as well as the measures taken to improve oral hygiene are not dependent on the size of the home.

Conclusions

A prevention program specially tailored to the needs of senior, similar to that established for children in the context of individual and group prophylaxis, is absolutely required. The discrepancy between the objective oral condition and the patients' subjective assessment of their oral health can only be reconciled if regular dental check-ups are performed. These checkups are important in order to reduce oral diseases like secondary caries and Periodontitis, which is associated to general diseases like diabetes. Thus, the general state of health can be influenced positive by an improved oral health.

To avoid placing an undue burden on the nursing staff and to avoid cumbersome transports, these check-ups must take place in the home. Dentists should be allowed to offer check-ups and dental prophylaxis programs in nursing and retirement homes. These services must of course be adequately remunerated. Relatives, dentists, healthcare payers, health services and nursing care facilities would need engage in even more interdisciplinary networking to ensure the best possible dental health of institutionalized seniors.

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